IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**In re application of:**
Larry C. Olsen et al.

**Application No.** 10/726,744

**Filed:** December 2, 2003

**Confirmation No.** 6833

**For:** THERMOELECTRIC DEVICES AND APPLICATIONS FOR THE SAME

**FILED VIA EFS**
**ON** 9/1/2010

**Examiner:** Jeffrey Thomas Barton

**Art Unit:** 1795

**Attorney Reference No.** 23-65037-01

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COMMISSIONER FOR PATENTS

**DECLARATION OF PAUL H. MCCLELLAND UNDER 37 CFR § 1.132**

PAUL H. MCCLELLAND, being duly sworn does hereby declare and affirm the following:

1. That he received a Bachelor of Science degree in Chemistry from Portland State College in 1965 and a Master of Science degree in Chemistry from the University of Arizona in 1970; that he has over 44 years' experience in analysis and process development in the fields of display and power delivery systems that extract, convert, and/or store energy.

2. That he is a VP of Technology and Chief Technology Officer of Perpetua Power Source Technologies, Inc., which is a licensee of Battelle Memorial Institute, the Assignee of Application No. 10/726,744.

3. That he is the principal Investigator on NSF SBIR 09-541, completed June 2009 "Flexible Thin-Film Thermoelectric Wearable Energy Harvester" and advisor to DHS SBIR-2009.2 "Wearable Thermoelectric Generators for First Responders" awarded July 2010.

4. That he was employed as a Process Development Engineer and Project Manager at Tektronix Inc. in the field of test, measurement and monitoring technology, from 1966 to 1977; that he previously worked as a Senior Scientist and R&D Lab Manager in the inkjet print head development lab for the

consumer printing industry at Hewlett Packard from 1977-2002; that he previously worked as a New Product Development Specialist in the test and measurement industry at Applied Physics Technologies from 2002-2004; that he worked as a co-founder, Chief Technology Officer and Advanced Product Development Specialist in the photovoltaic solar industry at Gen3 Solar/OptiSolar Inc. from 2005-2009; that he works as a Principle Scientist and is an owner in the technology consulting industry at Materials & Process Research LLC/MatPro Consulting Services from 2003-present; and that he works as an interim Chief Technology Officer in the water quality monitoring industry at ZAPS Technologies from 2009-present.

5. That he has read the Examiner's rejections in regard to the pending claims in Application No. 10/726,744 in the Office action dated March 3, 2010, and the Migowski and Böttner references cited therein.

6. That he understands the Examiner states that the Böttner reference names the compounds of the pending claims, $Bi_xTe_y$, $Sb_xTe_y$, or $Bi_xSe_y$ wherein x and y form a non-stoichiometric compound and wherein *x* is about 2 and *y* is about 3, and that the Examiner states that the same reference also enables the preparation of those compounds.

7. That he disagrees with the Examiner's assertions as to Böttner because the Böttner reference fails to enable one of ordinary skill in the art to make the compounds disclosed and claimed in the present application for at least the following reasons:

   a. That Böttner enables only elemental sputtering, not the necessary simultaneous co-sputtering needed to produce the non-stoichiometric compounds of the presently claimed invention.
      i. That Böttner fails to provide sufficient detail for one of ordinary skill in the art to make the compounds for which it is being cited by the Examiner but instead merely names those compounds.
      ii. That the first line in the section "Growth of Thermoelectric materials" (page 514), referred to by the Examiner, makes a statement that "n-$Bi_2Te_3$ and p-$(Bi,Sb)_2Te_3$ materials were grown by co-sputtering from 6" elemental targets but that Böttner makes only that statement and otherwise fails to teach how to make the p-type material. That Böttner indicates that elemental targets of Bi, Sb and Te were used to deposit n-$Bi_2Te_3$ and p-$(Bi,Sb)_2Te_3$ materials and refers to annealing the materials to adjust properties without any further detail. That as a skilled person in the art he does not believe that Böttner shows how to achieve making his disclosed compounds having the disclosed properties. Specifically that, e.g., the following information needed to make the compounds for which the Examiner cites the Böttner reference, is not provided:

- ✓ Power levels applied to targets,
- ✓ Magnitude of the atomic flux emitted from each target;
- ✓ Substrate temperatures required during deposition;
- ✓ Temperatures used to anneal the films to adjust properties as disclosed; or
- ✓ The approach used for growth of p-$(Bi,Sb)_2Te_3$ materials.

iii. That as one of ordinary skill he might guess that elemental targets of Bi and Sb might be used to grow the films with particular Bi/Sb ratios but that there is not sufficient detail in Böttner to be able to make the compositions without excessive experimentation and that this would be merely a guess at just one parameter detail needed.

iv. That Figure 11a of Böttner, referred to by the Examiner, describes values for Seebeck coefficients of particular p-type materials versus Te content. That these films are referred to as (Bi,Sb,Te) materials but that Böttner does not disclose how to grow materials with such properties.

v. That Böttner briefly mentions the potential use of selenium as a component, but that Böttner did not disclose that films were deposited that incorporated selenium or how to make such films.

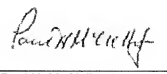
vi. That Figure 10a describes Seebeck coefficient of films versus Te content in atomic percent, that data are presented for cold sputtered and hot sputtered Bi2Te3, and annealed materials but that there is no indication in the reference that the information recited in Fig. 10a is for co-sputter films from bismuth and tellurium targets and that there is no disclosure in Böttner as to how to obtain compounds that would have the values listed in Figure 10a.

vii. That without the information noted above as necessary, as one of ordinary skill in the art, he does not believe that Böttner is enabling for that which the Examiner cites it as allegedly teaching.

b. That additionally Böttner does not disclose deposition of n-type and p-type material on one substrate but instead discloses a wafer-based system that is a miniaturization of a bulk Peltier device, having metallization and n-type material on a first wafer and metallization and p-type material on a second wafer. That Böttner never teaches how to make both n-type and p-type material simultaneously on the same wafer and that Böttner does not show any method that allows for the deposition of both n-type and p-type material on the same substrate.

The undersigned declares that all statements made herein of his knowledge are true and that all statements made on information and belief are believed to be true and further, that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment under Section 1001 of Title 18 of the United States Code, and that any such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Executed at the place and date opposite the signature below.



Paul H. McClelland

At Monmouth, Oregon
(City and State)

on this 30th day of August 2010.